

# The Role of Recovery in Disease Spread

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## Abstract

Age of infection has been shown to influence host fecundity and mortality through parasite virulence. Specifically, in many systems, mortality increases, while fecundity decreases as the disease progresses. Furthermore, the ability of the infected host to recover may also depend on the age of infection. These changes, in turn, affect the between-host transmission.

To investigate how these mechanisms affect disease transmission, we focus on the zooplankton host *Daphnia dentifera* commonly known as "water flea", which experiences epidemics by the virulent fungus *Metschnikowia bicuspidata*. Using a partial differential equation formulation, we explicitly model disease induced mortality and recovery as functions of the age of infection and investigate how epidemiologically relevant quantities such as disease prevalence and the basic reproductive number  $R_0$  depend on them.